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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR- | ATTORNEY DOCKET NO.   | CONFIRMATION NO. |
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| 10/790,146  | 03/02/2004  | Eugene I. Chong       | 19111.0143            | 3039             |
| 23517 7590 01/03/2007<br>BINGHAM MCCUTCHEN LLP<br>3000 K STREET, NW<br>BOX 1P<br>WASHINGTON, DC 20007 |             |                       | EXAMINER<br>WU, YICUN |                  |
|   |             |                       | ART UNIT<br>2165      | PAPER NUMBER     |
| SHORTENED STATUTORY PERIOD OF RESPONSE  |             | MAIL DATE             | DELIVERY MODE         |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/790,146

Applicant(s)

CHONG ET AL.

Examiner

Yicun Wu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

*Yicun Wu*  
Patent Examiner  
Technology Center  
2165

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 3/2/04 5/27/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### III. DETAILED ACTION

1. Claims 1-16 are presented for examination.

#### **Claim Objections**

2. Claim 1 is objected to because of the following informalities: the Examiner is not clear about the meaning of the claim. “corresponding”.

Claim 3-4, 6, 12-16 is objected to because of the following informalities: the Examiner is not clear about the meaning of the claim. “guess-database”.

Claim 4, 12 is objected to because of the following informalities: the Examiner is not clear about the meaning of the claim. “guess-database address quality”

Appropriate correction is required.

#### **Claim Rejections - 35 USC 101**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

3. Claims 1-16 are rejected under 35 U.S.C. 101 because the claims are directed to a non-statutory subject matter, specifically, the claims are not directed towards the final result that is “useful, tangible and concrete (See State Street, 149 F.3d at 1373-74 USPQ2d at 1601-02).

According to the New Guidelines of October 26, 2005, which states that “A claim limited to a machine or manufacture, which has a practical application, is statutory. In most cases a

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claim to a specific machine or manufacture will have a practical application. See Alappat, 33 F.3d at 1544, 31 USPQ2d at 1557)... a specific machine to produce a useful, concrete, and tangible result (State Street, 149 F.3d at 1373-74 USPQ2d at 1601-02).

Examiner requests Applicant to include in Applicant's claimed limitations (in all the claims) the following:

*Claim limitation describing --*

- 1. What is the practical application?*
- 2. What is final result which Applicant considers concrete, useful and tangible?*

Because the "practical application, result, concrete, useful and tangible" limitations are not claimed in Applicant's claims, Examiner asserts that the above listed claims are nonstatutory.

Claim 15 is rejected under 35 U.S.C. 101 because the claims are directed to a non-statutory subject matter, specifically, directed towards "computer readable medium".

computer program claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional

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interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035. Accordingly, it is important to distinguish claims that define descriptive material per se from claims that define statutory inventions.

Page 15, lines 15-20 is evidence that Applicant intends for "computer usable medium" to include embodiments where the medium is not limited to the media that the Office believes are capable of realizing the underlying functionality of the instructions.

**Claim Rejections - 35 USC § 103**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. Patent 6,266,660) in view of Whang et al. (U.S. Patent 6,349,308).

As to Claim 1, Liu et al. discloses a system for organizing and accessing a database, the system comprising:

- a primary B-tree index (col. 2, lines 30-45);
- a secondary B-tree index (col. 2, lines 30-45);
- a plurality of mapping table row identifiers stored in the secondary B-tree index (col. 2, lines 30-45); and

a plurality of database addresses for leaf blocks of the primary B-tree index corresponding to mapping table rows (col. 2, lines 30-45).

Liu et al. does not teach a B+tree.

Whang et al. teaches a B+tree (Fig. 2-5).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Liu et al. with a B+tree.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Liu et al. by the teaching of Whang et al. because providing the B+tree allows proper handling of deletion as taught by Whang et al. (Col. 3, line 14-18).

As to Claims 2 and 14, Liu et al. as modified teaches a system, wherein 4 bytes of the database addresses are stored in the secondary B+tree index (it is well known in the art to store 4 bytes of the database addresses).

As to Claim 3, Liu et al. as modified teaches a system, wherein the database addresses correspond to a guess-database address (Liu et al. Col. 3, line 14-18).

As to Claim 4, Liu et al. as modified teaches a system, wherein guess-database address quality statistic for the secondary index and a guess-database address quality statistic for the mapping table, both statistics being operable to assess guess database address quality (it is well known in the art to have statistics gathered).

As to Claims 5, 15 -16, Liu et al. as modified teaches a method for managing a database system, the method comprising:

creating a secondary index (Liu et al. col. 2, lines 30-45) for a B+tree structure(Whang et al. Fig. 2), wherein the secondary index structure comprises a plurality of rows each comprising an index key value (Liu et al. col. 2, lines 30-45), a mapping table rowid value and a guess-database address value (Liu et al. col. 2, lines 30-45 and Fig. 2-3).

As to Claim 6, Liu et al. as modified teach inserting a row of the secondary index structure, wherein inserting the row comprises inserting a row comprising an index key value, a mapping table rowid value and a guess database address value (Whang et al. Fig. 4 and 5).

As to Claim 7, Liu et al. as modified teaches a method comprising:

deleting a row of the secondary index, wherein deleting the row comprises locating a row comprising an index key value and a mapping table row identifier and deleting the row (Whang et al. Fig. 4 and 5).

As to Claim 7, Liu et al. as modified teaches a method comprising:

updating the secondary index, wherein updating the secondary index comprises locating a row of the secondary index comprising an old index key and a mapping table row identifier, deleting the row and inserting in the row a new index key value, a mapping table row identifier and a guess database address (Whang et al. Fig. 4 and 5).

As to Claim 9, Liu et al. as modified teaches a method, further comprising carrying out a query utilizing the secondary index, wherein carrying out the query comprises:

utilizing a guess-database address stored as part of a secondary index row to find a row in the primary B+tree structure (Liu et al. col. 2, lines 30-45) and (Whang et al. Fig. 2);

obtaining a target database block from the row in the primary B+tree structure (Liu et al. col. 2, lines 30-45) and (Whang et al. Fig. 2);

searching the target database block for a row that contains a mapping table row identifier that is the same as a mapping table row identifier stored in the secondary index row (Liu et al. col. 2, lines 30-45) and (Whang et al. Fig. 2); and

if the row in the database block matches the target database block, then the correct row in the database has been located and the query is completed (Liu et al. col. 2, lines 30-45) and (Whang et al. Fig. 2-5).

As to Claim 10, Liu et al. as modified teaches a method wherein if the row in the database block does not match the target database block, carrying out the query further comprises:

accessing the mapping table row stored in the secondary index row (Liu et al. col. 2, lines 30-45 and Fig. 2-3);

utilizing a guess-database address stored in the mapping table row to access a target block of the database (Liu et al. col. 2, lines 30-45 and Fig. 2-3);



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searching the target block for a primary key that matches a primary key stored in the mapping table row (Liu et al. col. 2, lines 30-45 and Fig. 2-3); and

if the primary key is found, then the query is completed (Liu et al. col. 2, lines 30-45 and Fig. 3).

As to Claim 11, Liu et al. as modified teaches a method wherein if the primary key is not located carrying out the query further comprises:

traversing the primary B+tree structure (Whang et al. Fig. 2) utilizing the primary key value from the mapping table row to identify the database address to complete the query (Liu et al. col. 2, lines 30-45 and Fig. 3).

As to Claim 12, Liu et al. as modified teaches a method comprising:

maintaining a guess-database address quality statistic for the secondary index (it is well known in the art to maintain statistics);

maintaining a guess-database address quality statistic for the mapping table (it is well known in the art to maintain statistics);

utilizing the statistics to assess guess-database; address quality (it is well known in the art to use statistics); and

carrying out the query based upon guess-database quality in the secondary index and mapping table (it is well known in the art to use statistics).

**Allowable subject Matter**

6. Claim 13 would be allowable if rewritten in independent form and if rewritten to overcome the rejection(s) under 35 U.S.C. 101 set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record (Liu et al. (U.S. Patent 6,266,660) in view of Whang et al. (U.S. Patent 6,349,308)) does not disclose, teach or suggest the claimed limitations of (in combination with all other features in the claims):

estimating guess-database address quality; estimating the cost of the query based upon the estimated guess-database address quality; and carrying out the query starting with an index structure with the lowest estimated cost, as claimed in claim 13.


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**Conclusion**

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yicun Wu whose telephone number is 571-272-4087. The examiner can normally be reached on 8:00 am to 4:30 pm, Monday -Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2100.

  
Yicun Wu  
Patent Examiner  
Technology Center 2100

December 18, 2006